



| FORM PTO 1449<br>REV. 7-80   |                   |  |  | U.S. DEPARTMENT OF COMMERCE<br>PATENT AND TRADEMARK OFFICE |                |  |            | ATTY. DOCKET NO.<br>CRP-056 | SERIAL NO.<br>599,543      |    |
|--|-------------------|--|--|--|----------------|--|------------|-----------------------------|----------------------------|----|
| LIST OF REFERENCES CITED BY APPLICANT<br>(Use several sheets if necessary) |                   |  |  | APPLICANT<br>Oppermann et al.                              |                |  |            |                             |                            |    |
|  |                   |  |  | FILING DATE<br>October 18, 1990                            | GROUP<br>1503  |  |            |                             |                            |    |
| U.S. PATENT DOCUMENTS  |                   |  |  |  |                |  |            |                             |                            |    |
| EXAMINER INITIAL   |                   | DOCUMENT NUMBER                              |  | DATE   | NAME           |  | CLASS      | SUBCLASS                    | FILING DATE IF APPROPRIATE |    |
| NMM  | AA                | 4 1 7 2 1 2 8                                |  | 10/79  | Thiele et al.  |  | 424        | 95                          |                            |    |
|  | AB                | 4 2 9 4 7 5 3                                |  | 10/81  | Urist          |  | 530<br>260 | 840<br>442                  |                            |    |
|  | AC                | 4 3 9 4 3 7 0                                |  | 07/83  | Jefferies      |  | 424        | 15                          |                            |    |
|  | AD                | 4 4 3 4 0 9 4                                |  | 02/84  | Seyedin et al. |  | 530<br>260 | 840<br>442                  |                            |    |
|  | AE                | 4 4 5 5 2 5 6                                |  | 06/84  | Urist          |  | 530<br>260 | 840<br>442                  |                            |    |
|  | AF                | 4 5 6 3 3 5 0                                |  | 01/86  | Nathan et al.  |  | 424        | 95                          |                            |    |
|  | AG                | 4 5 6 3 4 8 9                                |  | 01/86  | Urist          |  | 524        | 21                          |                            |    |
|  | AH                | 4 6 5 7 5 4 8                                |  | 04/87  | J. Nichols     |  | 623        | 10                          |                            |    |
|  | AI                | 4 7 0 3 1 0 8                                |  | 10/87  | Silver et al.  |  | 530        | 356                         |                            |    |
|  | AJ                | 4 7 2 5 6 7 1                                |  | 02/88  | Chu et al.     |  | 530        | 356                         |                            |    |
| NMM  | AK                | 4 7 8 9 6 6 3                                |  | 12/88  | Wallace et al. |  | 514        | 21                          |                            |    |
| FOREIGN PATENT DOCUMENTS   |                   |  |  |  |                |  |            |                             |                            |    |
|  |                   | DOCUMENT NUMBER                              |  | DATE   | COUNTRY        |  | CLASS      | SUBCLASS                    | TRANSLATION                |    |
| NMM  | AL                | 8 9 0 9 6 0 5                                |  | 10/89  | PCT/US         |  |            |                             | YES                        | NO |
|  | AM                | 8 5 0 5 2 7 4                                |  | 12/85  | PCT/WO         |  |            |                             |                            |    |
|  | AN                | 8 6 0 0 5 2 6                                |  | 01/86  | PCT/WO         |  |            |                             |                            |    |
|  | AO                | 8 8 0 0 2 0 5                                |  | 01/88  | PCT/WO         |  |            |                             |                            |    |
| NMM  | AP                | 8 9 1 0 4 0 9                                |  | 11/89  | PCT/WO         |  |            |                             |                            |    |
| OTHERS (Including Author, Title, Date, Pertinent Pages, Etc.)              |                   |  |  |  |                |  |            |                             |                            |    |
| NMM  | AR                | Canalis et al., Science 210:1021-1023 (1980) |  |  |                |  |            |                             |                            |    |
| NMM  | AS                | Glowacki et al., Lancet 1:959-963 (1981)     |  |  |                |  |            |                             |                            |    |
| NMM  | AT                | Reddi, Collagen Rel. Res. 1:209-226 (1981)   |  |  |                |  |            |                             |                            |    |
| EXAMINER   | Matthew M. Nutter |  |  | DATE CONSIDERED<br>2-92                                    |                |  |            |                             |                            |    |

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| *EXAMINER INITIAL  |    | DOCUMENT NUMBER   | DATE  | NAME                            | CLASS                 | SUBCLASS | FILING DATE IF APPROPRIATE |
| NMM  | AA | 4 7 9 5 4 6 7   | 01/89 | Piez et al.                     | 623                   | 16       |                            |
|  | AB | 4 8 1 2 1 2 0   | 03/89 | Flanagan et al.                 | 433                   | 173      |                            |
|  | AC | 4 8 2 4 9 3 9   | 04/89 | Simpson                         | 530                   | 840      |                            |
|  | AD | 4 8 3 7 2 8 5   | 06/89 | Bero et al.                     | 530                   | 356      |                            |
|  | AE | 4 8 7 7 8 6 4   | 10/89 | Wang et al.                     | 530                   | 324      |                            |
| NMM  | AF | 4 8 9 4 4 4 1   | 01/90 | Menicagli                       | 530                   | 840      |                            |
|  | AG |   |       |                                 |                       |          |                            |
|  | AH |   |       |                                 |                       |          |                            |
|  | AI |   |       |                                 |                       |          |                            |
|  | AJ |   |       |                                 |                       |          |                            |
|  | AK |   |       |                                 |                       |          |                            |
| FOREIGN PATENT DOCUMENTS   |    |   |       |                                 |                       |          |                            |
|  |    | DOCUMENT NUMBER   | DATE  | COUNTRY                         | CLASS                 | SUBCLASS | TRANSLATION<br>YES      NO |
| NMM  | AL | 9 0 0 3 7 3 3   | 2/90  | PCT/WO                          |                       |          |                            |
|  | AM | 0 6 9 2 6 0   | 6/83  | EPO                             |                       |          |                            |
|  | AN | 1 2 8 0 4 1   | 12/84 | EPO                             |                       |          |                            |
|  | AO | 1 4 8 1 5 5   | 01/85 | EPO                             |                       |          |                            |
| NMM  | AP | 1 6 9 0 0 1   | 07/85 | EPO                             |                       |          |                            |
| OTHERS (Including Author, Title, Date, Pertinent Pages, Etc.)              |    |   |       |                                 |                       |          |                            |
| NMM  | AR | Sampath et al. Proc. Natl. Acad. Sci. USA 78:7599-7603 (1981) |       |                                 |                       |          |                            |
| NMM  | AS | Farley et al., Biochem. 21:3508-3513 (1982)                   |       |                                 |                       |          |                            |
| NMM  | AT | Maugh et al., Science 217:819 (1982)                          |       |                                 |                       |          |                            |
| EXAMINER<br><u>Matthew M. Wuttke</u>                                       |    |   |       | DATE CONSIDERED<br><u>2-92</u>  |                       |          |                            |

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|   |  |  | FILING DATE<br>October 18, 1990 | GROUP<br>1503         |

## U.S. PATENT DOCUMENTS

| EXAMINER INITIAL |    | DOCUMENT NUMBER | DATE | NAME | CLASS | SUBCLASS | FILING DATE IF APPROPRIATE |
|------------------|----|-----------------|------|------|-------|----------|----------------------------|
|                  | AA |                 |      |      |       |          |                            |
|                  | AB |                 |      |      |       |          |                            |
|                  | AC |                 |      |      |       |          |                            |
|                  | AD |                 |      |      |       |          |                            |
|                  | AE |                 |      |      |       |          |                            |
|                  | AF |                 |      |      |       |          |                            |
|                  | AG |                 |      |      |       |          |                            |
|                  | AH |                 |      |      |       |          |                            |
|                  | AI |                 |      |      |       |          |                            |
|                  | AJ |                 |      |      |       |          |                            |
|                  | AK |                 |      |      |       |          |                            |

## FOREIGN PATENT DOCUMENTS

|     |    | DOCUMENT NUMBER | DATE  | COUNTRY | CLASS | SUBCLASS | TRANSLATION |    |
|-----|----|-----------------|-------|---------|-------|----------|-------------|----|
|     |    |                 |       |         |       |          | YES         | NO |
| NMW | AL | 1 6 9 0 1 6     | 1/86  | EPO     |       |          |             |    |
|     | AM | 1 0 2 4 8 3     | 10/85 | EPO     |       |          |             |    |
|     | AN | 1 7 0 9 7 9     | 7/85  | EPO     |       |          |             |    |
|     | AO | 2 1 2 4 7 4     | 08/86 | EPO     |       |          |             |    |
| NMW | AP | 2 3 0 6 4 7     | 05/87 | EPO     |       |          |             |    |

## OTHERS (Including Author, Title, Date, Pertinent Pages, Etc.)

|     |    |  |
|-----|----|--|
| NMW | AR | Sampath et al., Proc. Natl. Acad. Sci. USA 80:6591-6595 (1983) |
| NMW | AS | Seyedin et al., J. Cell Biol. 17:1950-1953 (1983)              |
| NMW | AT | Urist et al., Proc. Soc. Exp. Bio. Med. 173:194-199 (1983)     |

|          |                        |                         |
|----------|------------------------|-------------------------|
| EXAMINER | <i>Matthew M. Nutt</i> | DATE CONSIDERED<br>2-92 |
|----------|------------------------|-------------------------|

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|   |    |   |                         | FILING DATE<br>October 18, 1990 | GROUP<br>1583         |          |                            |
| U.S. PATENT DOCUMENTS   |    |   |                         |                                 |                       |          |                            |
| *EXAMINER INITIAL   |    | DOCUMENT NUMBER   | DATE                    | NAME                            | CLASS                 | SUBCLASS | FILING DATE IF APPROPRIATE |
| AA  |    |   |                         |                                 |                       |          |                            |
| AB  |    |   |                         |                                 |                       |          |                            |
| AC  |    |   |                         |                                 |                       |          |                            |
| AD  |    |   |                         |                                 |                       |          |                            |
| AE  |    |   |                         |                                 |                       |          |                            |
| AF  |    |   |                         |                                 |                       |          |                            |
| AG  |    |   |                         |                                 |                       |          |                            |
| AH  |    |   |                         |                                 |                       |          |                            |
| AI  |    |   |                         |                                 |                       |          |                            |
| AJ  |    |   |                         |                                 |                       |          |                            |
| AK  |    |   |                         |                                 |                       |          |                            |
| FOREIGN PATENT DOCUMENTS  |    |   |                         |                                 |                       |          |                            |
|   |    | DOCUMENT NUMBER   | DATE                    | COUNTRY                         | CLASS                 | SUBCLASS | TRANSLATION<br>YES      NO |
| NM  | AL | 3 0 9 2 4 1   | 09/88                   | EPO                             |                       |          |                            |
| NM  | AM | 2 1 7 B 4 4 7   | 02/87                   | GB                              |                       |          |                            |
|   | AN |   |                         |                                 |                       |          |                            |
|   | AO |   |                         |                                 |                       |          |                            |
|   | AP |   |                         |                                 |                       |          |                            |
| OTHERS (Including Author, Title, Date, Pertinent Pages, Etc.)   |    |   |                         |                                 |                       |          |                            |
| NM  | AR | Simpson et al., Trends Biochem. Sci. 9:527-530 (1984)       |                         |                                 |                       |          |                            |
| NM  | AS | Strand et al., Biotech. Boeing. 26:503-507 (1984)           |                         |                                 |                       |          |                            |
| NM  | AT | Urist et al., Clin. Orth. Rel. Res. 187:277-280 (1984)      |                         |                                 |                       |          |                            |
| EXAMINER<br><i>Uthra M Uthra</i>  |    |   | DATE CONSIDERED<br>2-92 |                                 |                       |          |                            |
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| AJ  |    |  |   |               |                             |                       |                            |
| AK  |    |  |   |               |                             |                       |                            |
| FOREIGN PATENT DOCUMENTS  |    |  |   |               |                             |                       |                            |
|   |    | DOCUMENT NUMBER  | DATE  | COUNTRY       | CLASS                       | SUBCLASS              | TRANSLATION                |
|   |    |  |   |               |                             |                       | YES      NO                |
| AL  |    |  |   |               |                             |                       |                            |
| AM  |    |  |   |               |                             |                       |                            |
| AN  |    |  |   |               |                             |                       |                            |
| AO  |    |  |   |               |                             |                       |                            |
| AP  |    |  |   |               |                             |                       |                            |
| OTHERS (Including Author, Title, Date, Pertinent Pages, Etc.)   |    |  |   |               |                             |                       |                            |
| NM  | AR | Urist et al. II, Proc. Natl. Acad. Sci. USA 81:371-375 (1984)    |   |               |                             |                       |                            |
|   |    |  |   |               |                             |                       |                            |
| NM  | AS | Centrella et al., Proc. Natl. Acad. Sci. USA 82:7335-7339 (1985) |   |               |                             |                       |                            |
|   |    |  |   |               |                             |                       |                            |
| NM  | AT | Klausner, Biotechnology 3:567-568 (1985)                         |   |               |                             |                       |                            |
|   |    |  |   |               |                             |                       |                            |
| EXAMINER<br><i>Uathra W. Mutter</i>   |    | DATE CONSIDERED<br><i>2-92</i>                                   |   |               |                             |                       |                            |
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|   |                         |  |                                | FLING DATE<br>October 18, 1990 | GROUP<br>1503         |          |                            |  |
| U.S. PATENT DOCUMENTS   |                         |  |                                |                                |                       |          |                            |  |
| *EXAMINER INITIAL   |                         | DOCUMENT NUMBER  | DATE                           | NAME                           | CLASS                 | SUBCLASS | FILING DATE IF APPROPRIATE |  |
| AA  |                         |  |                                |                                |                       |          |                            |  |
| AB  |                         |  |                                |                                |                       |          |                            |  |
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| AD  |                         |  |                                |                                |                       |          |                            |  |
| AE  |                         |  |                                |                                |                       |          |                            |  |
| AF  |                         |  |                                |                                |                       |          |                            |  |
| AG  |                         |  |                                |                                |                       |          |                            |  |
| AH  |                         |  |                                |                                |                       |          |                            |  |
| AI  |                         |  |                                |                                |                       |          |                            |  |
| AJ  |                         |  |                                |                                |                       |          |                            |  |
| AK  |                         |  |                                |                                |                       |          |                            |  |
| FOREIGN PATENT DOCUMENTS  |                         |  |                                |                                |                       |          |                            |  |
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| AL  |                         |  |                                |                                |                       |          |                            |  |
| AM  |                         |  |                                |                                |                       |          |                            |  |
| AN  |                         |  |                                |                                |                       |          |                            |  |
| AO  |                         |  |                                |                                |                       |          |                            |  |
| AP  |                         |  |                                |                                |                       |          |                            |  |
| OTHERS (Including Author, Title, Date, Pertinent Pages, Etc.)   |                         |  |                                |                                |                       |          |                            |  |
| NNN   | AR                      | Olson et al., Analyt. Biochem. 146:232-237 (1985)  |                                |                                |                       |          |                            |  |
|   |                         |  |                                |                                |                       |          |                            |  |
| NNN   | AS                      | Reddi, J., Biomed. Mat. Res. 19:233-239 (1985)   |                                |                                |                       |          |                            |  |
|   |                         |  |                                |                                |                       |          |                            |  |
| NNN   | AT                      | Sampath et al., Extracellular Matrix: Structure and Function (A.H. Reddi, Ed.) Allen R. Liss, Pub., NY, pp. 412-428 (1985) |                                |                                |                       |          |                            |  |
|   |                         |  |                                |                                |                       |          |                            |  |
| EXAMINER  | <i>Mather M. Mather</i> |  | DATE CONSIDERED<br><u>2-92</u> |                                |                       |          |                            |  |
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| AA                |  |                 |      |      |       |          |                            |
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| AC                |  |                 |      |      |       |          |                            |
| AD                |  |                 |      |      |       |          |                            |
| AE                |  |                 |      |      |       |          |                            |
| AF                |  |                 |      |      |       |          |                            |
| AG                |  |                 |      |      |       |          |                            |
| AH                |  |                 |      |      |       |          |                            |
| AI                |  |                 |      |      |       |          |                            |
| AJ                |  |                 |      |      |       |          |                            |
| AK                |  |                 |      |      |       |          |                            |

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|----|--|-----------------|------|---------|-------|----------|-------------|----|
|    |  |                 |      |         |       |          | YES         | NO |
| AL |  |                 |      |         |       |          |             |    |
| AM |  |                 |      |         |       |          |             |    |
| AN |  |                 |      |         |       |          |             |    |
| AO |  |                 |      |         |       |          |             |    |
| AP |  |                 |      |         |       |          |             |    |

## OTHERS (Including Author, Title, Date, Pertinent Pages, Etc.)

|     |    |  |
|-----|----|--|
| NNN | AR | Seyedin et al., Proc. Natl. Acad. Sci. USA 82:2267-2271 (1985) |
|     |    |  |
| NNN | AS | Colowick et al., Methods in Enzymology 146:294-312 (1987)      |
|     |    |  |
| NNN | AT | Deatherage et al., Collagen Rel. Res. 7:225-231 (1987)         |
|     |    |  |

| EXAMINER                | DATE CONSIDERED |
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| <u>Nathan M. Nutter</u> | 2-92            |

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|   | AB                       |  |      |   |               |                             |                            |
|   | AC                       |  |      |   |               |                             |                            |
|   | AD                       |  |      |   |               |                             |                            |
|   | AE                       |  |      |   |               |                             |                            |
|   | AF                       |  |      |   |               |                             |                            |
|   | AG                       |  |      |   |               |                             |                            |
|   | AH                       |  |      |   |               |                             |                            |
|   | AI                       |  |      |   |               |                             |                            |
|   | AJ                       |  |      |   |               |                             |                            |
|   | AK                       |  |      |   |               |                             |                            |
| FOREIGN PATENT DOCUMENTS  |                          |  |      |   |               |                             |                            |
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|   | AL                       |  |      |   |               |                             |                            |
|   | AM                       |  |      |   |               |                             |                            |
|   | AN                       |  |      |   |               |                             |                            |
|   | AO                       |  |      |   |               |                             |                            |
|   | AP                       |  |      |   |               |                             |                            |
| OTHERS (Including Author, Title, Date, Pertinent Pages, Etc.)   |                          |  |      |   |               |                             |                            |
| NM  | AR                       | Padgett et al., Nature 325:81-84 (1987)                        |      |   |               |                             |                            |
| NM  | AS                       | Sampath et al., Proc. Natl. Acad. Sci. USA 84:7109-7113 (1987) |      |   |               |                             |                            |
| NM  | AT                       | Spector, J. Anthroplasty 2:163-177 (1987)                      |      |   |               |                             |                            |
| EXAMINER  | <i>Matthew M. Mutter</i> |  |      | DATE CONSIDERED<br><i>2-9-92</i>                            |               |                             |                            |
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|---|----|---|-----------------|---|---------------|-----------------------------|-----------------------|----------------------------|
| LIST OF REFERENCES CITED BY APPLICANT<br><i>(Use several sheets if necessary)</i> |    |   |                 | APPLICANT<br>Uppermann et al.                               |               |                             |                       |                            |
|   |    |   |                 | FILING DATE<br>October 18, 1990                             | GROUP<br>1503 |                             |                       |                            |
| U.S. PATENT DOCUMENTS   |    |   |                 |   |               |                             |                       |                            |
| *EXAMINER INITIAL   |    | DOCUMENT NUMBER   | DATE            | NAME  |               | CLASS                       | SUBCLASS              | FILING DATE IF APPROPRIATE |
| AA  |    |   |                 |   |               |                             |                       |                            |
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| FOREIGN PATENT DOCUMENTS  |    |   |                 |   |               |                             |                       |                            |
|   |    | DOCUMENT NUMBER   | DATE            | COUNTRY   |               | CLASS                       | SUBCLASS              | TRANSLATION<br>YES      NO |
| AL  |    |   |                 |   |               |                             |                       |                            |
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| OTHERS (Including Author, Title, Date, Pertinent Pages, Etc.)                     |    |   |                 |   |               |                             |                       |                            |
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| EXAMINER  |    |   | DATE CONSIDERED |   |               |                             |                       |                            |
| <i>Uattern W. Uatter</i> 2-22   |    |   |                 |   |               |                             |                       |                            |

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| LIST OF REFERENCES CITED BY APPLICANT<br><i>(Use several sheets if necessary)</i>   |    |   |                         | APPLICANT<br>Oppermann et al.                               |               |                             |                            |
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| *EXAMINER INITIAL   |    | DOCUMENT NUMBER   | DATE                    | NAME  | CLASS         | SUBCLASS                    | FILING DATE IF APPROPRIATE |
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| FOREIGN PATENT DOCUMENTS  |    |   |                         |   |               |                             |                            |
|   |    | DOCUMENT NUMBER   | DATE                    | COUNTRY   | CLASS         | SUBCLASS                    | TRANSLATION<br>YES      NO |
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| OTHERS (Including Author, Title, Date, Pertinent Pages, Etc.)   |    |   |                         |   |               |                             |                            |
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| <i>Nnn</i>  | AS | Deatherage et al., Int. J. Oral Maxillofac. Surg. 17:395-399 (1988) |                         |   |               |                             |                            |
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| EXAMINER<br><i>Uathra W. Uathra</i>   |    |   | DATE CONSIDERED<br>2-92 |   |               |                             |                            |
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CRP-056SERIAL NO.  
599,543LIST OF REFERENCES CITED BY APPLICANT  
(Use several sheets if necessary)APPLICANT  
Oppermann et al.FILING DATE  
October 18, 1990GROUP  
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| *EXAMINER INITIAL |    | DOCUMENT NUMBER | DATE | NAME | CLASS | SUBCLASS | FILING DATE IF APPROPRIATE |
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|-----------|----|--|
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| <i>NM</i> | AS | Wang et al., Calcified Tissue Int. (Supplement) Abs. No. 146, p. A37 |
|           |    | (1988)   |
| <i>NM</i> | AT | Wang et al., II, Proc. Natl. Acad. Sci. USA 85:9484-9488 (1988)      |
|           |    |  |

EXAMINER Walter M. Nutter DATE CONSIDERED 2-92

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| U.S. PATENT DOCUMENTS   |                      |  |                                |                                 |                       |          |                               |
| *EXAMINER INITIAL   |                      | DOCUMENT NUMBER  | DATE                           | NAME                            | CLASS                 | SUBCLASS | FILING DATE<br>IF APPROPRIATE |
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| OTHERS (Including Author, Title, Date, Pertinent Pages, Etc.)   |                      |  |                                |                                 |                       |          |                               |
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|   |                      | A37 (1988)   |                                |                                 |                       |          |                               |
| NM  | AS                   | Wozney et al., II, Science 242:1528-1534                           |                                |                                 |                       |          |                               |
|   |                      |  |                                |                                 |                       |          |                               |
| NM  | AT                   | Lyons et al., Proc. Natl. Acad. Sci. USA 86:4554-4558 (1989)       |                                |                                 |                       |          |                               |
|   |                      |  |                                |                                 |                       |          |                               |
| EXAMINER  | <i>Mather Mather</i> |  | DATE CONSIDERED<br><i>2-92</i> |                                 |                       |          |                               |
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## U.S. PATENT DOCUMENTS

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## OTHERS (Including Author, Title, Date, Pertinent Pages, Etc.)

|            |    |                                       |  |  |  |  |  |
|------------|----|---------------------------------------|--|--|--|--|--|
| <i>Nnn</i> | AR | Wang et al., PNAS 87:2220-2224 (1990) |  |  |  |  |  |
|            |    |                                       |  |  |  |  |  |
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| EXAMINER | <i>Ullman Wluth</i> | DATE CONSIDERED |
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